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3AH-7-1.1 To what is the deviation of an FM transmission proportional?
- A. Only the frequency of the audio modulating signal
- B. The frequency and the amplitude of the audio modulating signal
- C. The duty cycle of the audio modulating signal
- D. Only the amplitude of the audio modulating signal

3AH-7-2.1 What is the result of overdeviation in an FM transmitter?
- A. Increased transmitter power consumption
- B. Out-of-channel emissions (splatter)
- C. Increased transmitter range
- D. Inadequate carrier suppression

3AH-7-2.2 What is *splatter*?
- A. Interference to adjacent signals caused by excessive transmitter keying speeds
- B. Interference to adjacent signals caused by improper transmitter neutralization
- C. Interference to adjacent signals caused by overmodulation of a transmitter
- D. Interference to adjacent signals caused by parasitic oscillations at the antenna

SUBELEMENT 3AI—Antennas and Feed Lines (3 Exam Questions)

3AI-1-1.1 What antenna type best strengthens signals from a particular direction while attenuating those from other directions?
- A. A beam antenna
- B. An isotropic antenna
- C. A monopole antenna
- D. A vertical antenna

3AI-1-1.2 What is a *directional antenna*?
- A. An antenna whose parasitic elements are all constructed to be directors
- B. An antenna that radiates in direct line-of-sight propagation, but not skywave or skip propagation
- C. An antenna permanently mounted so as to radiate in only one direction
- D. An antenna that radiates more strongly in some directions than others

3AI-1-1.3 What is a *Yagi* antenna?
- A. Half-wavelength elements stacked vertically and excited in phase
- B. Quarter-wavelength elements arranged horizontally and excited out of phase
- C. Half-wavelength linear driven element(s) with parasitically excited parallel linear elements
- D. Quarter-wavelength, triangular loop elements

3AI-1-1.4 What is the general configuration of the radiating elements of a horizontally polarized Yagi?
- A. Two or more straight, parallel elements arranged in the same horizontal plane
- B. Vertically stacked square or circular loops arranged in parallel horizontal planes
- C. Two or more wire loops arranged in parallel vertical planes
- D. A vertical radiator arranged in the center of an effective RF ground plane

3AI-1-1.5 What type of parasitic beam antenna uses two or more straight metal-tubing elements arranged physically parallel to each other?
- A. A delta loop antenna
- B. A quad antenna
- C. A Yagi antenna
- D. A Zepp antenna

3AI-1-1.6 How many directly driven elements does a Yagi antenna have?
- A. None; they are all parasitic
- B. One
- C. Two
- D. All elements are directly driven

3AI-1-1.7 What is a *parasitic beam antenna*?
- A. An antenna where the director and reflector elements receive their RF excitation by induction or radiation from the driven element
- B. An antenna where wave traps are used to assure magnetic coupling among the elements
- C. An antenna where all elements are driven by direct connection to the feed line
- D. An antenna where the driven element receives its RF excitation by induction or radiation from the directors

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3AI-1-2.1 What is a *cubical quad antenna*?
A. Four parallel metal tubes, each approximately 1/2 electrical wavelength long
B. Two or more parallel four-sided wire loops, each approximately one electrical wavelength long
C. A vertical conductor 1/4 electrical wavelength high, fed at the bottom
D. A center-fed wire 1/2 electrical wavelength long

3AI-1-2.2 What kind of antenna array is composed of a square full-wave closed loop driven element with parallel parasitic element(s)?
A. Delta loop
B. Cubical quad
C. Dual rhombic
D. Stacked Yagi

3AI-1-2.3 Approximately how long is one side of the driven element of a cubical quad antenna?
A. 2 electrical wavelengths
B. 1 electrical wavelength
C. 1/2 electrical wavelength
D. 1/4 electrical wavelength

3AI-1-2.4 Approximately how long is the wire in the driven element of a cubical quad antenna?
A. 1/4 electrical wavelength
B. 1/2 electrical wavelength
C. 1 electrical wavelength
D. 2 electrical wavelengths

3AI-1-3.1 What is a *delta loop antenna*?
A. A variation of the cubical quad antenna, with triangular elements
B. A large copper ring, used in direction finding
C. An antenna system composed of three vertical antennas, arranged in a triangular shape
D. An antenna made from several coils of wire on an insulating form

3AI-2-1.1 To what does the term *horizontal* as applied to wave polarization refer?
A. The magnetic lines of force in the radio wave are parallel to the earth's surface
B. The electric lines of force in the radio wave are parallel to the earth's surface
C. The electric lines of force in the radio wave are perpendicular to the earth's surface
D. The radio wave will leave the antenna and radiate horizontally to the destination

3AI-2-1.2 What electromagnetic wave polarization does a cubical quad antenna have when the feed point is in the center of a horizontal side?
A. Circular
B. Helical
C. Horizontal
D. Vertical

3AI-2-1.3 What electromagnetic wave polarization does a cubical quad antenna have when all sides are at 45 degrees to the earth's surface and the feed point is at the bottom corner?
A. Circular
B. Helical
C. Horizontal
D. Vertical

3AI-2-2.1 What is the polarization of electromagnetic waves radiated from a half-wavelength antenna perpendicular to the earth's surface?
A. Circularly polarized waves
B. Horizontally polarized waves
C. Parabolically polarized waves
D. Vertically polarized waves

3AI-2-2.2 What is the electromagnetic wave polarization of most man-made electrical noise radiation in the HF-VHF spectrum?
A. Horizontal
B. Left-hand circular
C. Right-hand circular
D. Vertical

3AI-2-2.3 To what does the term *vertical* as applied to wave polarization refer?
A. The electric lines of force in the radio wave are parallel to the earth's surface
B. The magnetic lines of force in the radio wave are perpendicular to the earth's surface
C. The electric lines of force in the radio wave are perpendicular to the earth's surface
D. The radio wave will leave the antenna and radiate vertically into the ionosphere

3AI-2-2.4 What electromagnetic wave polarization does a cubical quad antenna have when the feed point is in the center of a vertical side?
A. Circular
B. Helical
C. Horizontal
D. Vertical

3AI-2-2.5 What electromagnetic wave polarization does a cubical quad antenna have when all sides are at 45 degrees to the earth's surface and the feed point is at a side corner?
A. Circular
B. Helical
C. Horizontal
D. Vertical

3AI-3-1.1 What is meant by the term *standing wave ratio*?
A. The ratio of maximum to minimum inductances on a feed line
B. The ratio of maximum to minimum resistances on a feed line
C. The ratio of maximum to minimum impedances on a feed line
D. The ratio of maximum to minimum voltages on a feed line

3AI-3-1.2 What is *standing wave ratio* a measure of?
A. The ratio of maximum to minimum voltage on a feed line
B. The ratio of maximum to minimum reactance on a feed line
C. The ratio of maximum to minimum resistance on a feed line
D. The ratio of maximum to minimum sidebands on a feed line

3AI-3-2.1 What is meant by the term *forward power*?
A. The power traveling from the transmitter to the antenna
B. The power radiated from the front of a directional antenna
C. The power produced during the positive half of the RF cycle
D. The power used to drive a linear amplifier

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3AI-3-2.2 What is meant by the term *reflected power*?
A. The power radiated from the back of a directional antenna
B. The power returned to the transmitter from the antenna
C. The power produced during the negative half of the RF cycle
D. Power reflected to the transmitter site by buildings and trees

3AI-3-3.1 What happens to the power loss in an unbalanced feed line as the standing wave ratio increases?
A. It is unpredictable
B. It becomes nonexistent
C. It decreases
D. It increases

3AI-3-3.2 What type of feed line is best suited to operating at a high standing wave ratio?
A. Coaxial cable
B. Flat ribbon "twin lead"
C. Parallel open-wire line
D. Twisted pair

3AI-3-3.3 What happens to RF energy not delivered to the antenna by a lossy coaxial cable?
A. It is radiated by the feed line
B. It is returned to the transmitter's chassis ground
C. Some of it is dissipated as heat in the conductors and dielectric
D. It is canceled because of the voltage ratio of forward power to reflected power in the feed line

3AI-4-1.1 What is a *balanced line*?
A. Feed line with one conductor connected to ground
B. Feed line with both conductors connected to ground to balance out harmonics
C. Feed line with the outer conductor connected to ground at even intervals
D. Feed line with neither conductor connected to ground

3AI-4-1.2 What is an *unbalanced line*?
A. Feed line with neither conductor connected to ground
B. Feed line with both conductors connected to ground to suppress harmonics
C. Feed line with one conductor connected to ground
D. Feed line with the outer conductor connected to ground at uneven intervals

3AI-4-2.1 What is a *balanced antenna*?
A. A symmetrical antenna with one side of the feed point connected to ground
B. An antenna (or a driven element in an array) that is symmetrical about the feed point
C. A symmetrical antenna with both sides of the feed point connected to ground, to balance out harmonics
D. An antenna designed to be mounted in the center

3AI-4-2.2 What is an *unbalanced antenna*?
A. An antenna (or a driven element in an array) that is not symmetrical about the feed point
B. A symmetrical antenna, having neither half connected to ground
C. An antenna (or a driven element in an array) that is symmetrical about the feed point
D. A symmetrical antenna with both halves coupled to ground at uneven intervals

3AI-4-3.1 What device can be installed on a balanced antenna so that it can be fed through a coaxial cable?
A. A balun
B. A loading coil
C. A triaxial transformer
D. A wavetrap

3AI-4-3.2 What is a *balun*?
A. A device that can be used to convert an antenna designed to be fed at the center so that it may be fed at one end
B. A device that may be installed on a balanced antenna so that it may be fed with unbalanced feed line
C. A device that can be installed on an antenna to produce horizontally polarized or vertically polarized waves
D. A device used to allow an antenna to operate on more than one band

3AI-5-1.1 List the following types of feed line in order of increasing attenuation per 100 feet of line (list the line with the lowest attenuation first): RG-8, RG-58, RG-174 and open-wire line.
A. RG-174, RG-58, RG-8, open-wire line
B. RG-8, open-wire line, RG-58, RG-174
C. open-wire line, RG-8, RG-58, RG-174
D. open-wire line, RG-174, RG-58, RG-8

3AI-5-1.2 You have installed a tower 150 feet from your radio shack, and have a 6-meter Yagi antenna on top. Which of the following feed lines should you choose to feed this antenna: RG-8, RG-58, RG-59 or RG-174?
A. RG-8
B. RG-58
C. RG-59
D. RG-174

3AI-5-2.1 You have a 200-foot coil of RG-58 coaxial cable attached to your antenna, but the antenna is only 50 feet from your radio. To minimize feed-line loss, what should you do with the excess cable?
A. Cut off the excess cable to an even number of wavelengths long
B. Cut off the excess cable to an odd number of wavelengths long
C. Cut off the excess cable
D. Roll the excess cable into a coil a tenth of a wavelength in diameter

3AI-5-2.2 How does feed-line length affect signal loss?
A. The length has no effect on signal loss
B. As length increases, signal loss increases
C. As length decreases, signal loss increases
D. The length is inversely proportional to signal loss

3AI-5-3.1 What is the general relationship between frequencies passing through a feed line and the losses in the feed line?

A. Loss is independent of frequency
B. Loss increases with increasing frequency
C. Loss decreases with increasing frequency
D. There is no predictable relationship

3AI-5-3.2 As the operating frequency decreases, what happens to conductor losses in a feed line?

A. The losses decrease
B. The losses increase
C. The losses remain the same
D. The losses become infinite

3AI-5-3.3 As the operating frequency increases, what happens to conductor losses in a feed line?

A. The losses decrease
B. The losses increase
C. The losses remain the same
D. The losses decrease to zero

3AI-6-1.1 You are using open-wire feed line in your amateur station. Why should you ensure that no one can come in contact with the feed line while you are transmitting?

A. Because contact with the feed line while transmitting will cause a short circuit, probably damaging your transmitter
B. Because the wire is so small they may break it
C. Because contact with the feed line while transmitting will cause parasitic radiation
D. Because high RF voltages can be present on open-wire feed line

3AI-6-2.1 How can you minimize exposure to radio frequency energy from your transmitting antennas?

A. Use vertical polarization
B. Use horizontal polarization
C. Mount the antennas where no one can come near them
D. Mount the antenna close to the ground

ELEMENT 3A ANSWER KEY

SUBELEMENT 3AA

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3AI-1-2.2	B	7-27
3AI-1-2.3	D	7-27
3AI-1-2.4	C	7-27
3AI-1-3.1	A	7-28
3AI-2-1.1	B	7-24
3AI-2-1.2	C	7-27
3AI-2-1.3	C	7-27
3AI-2-2.1	D	7-25
3AI-2-2.2	D	7-25
3AI-2-2.3	C	7-24
3AI-2-2.4	D	7-27
3AI-2-2.5	D	7-27
3AI-3-1.1	D	7-5
3AI-3-1.2	A	7-5
3AI-3-2.1	A	7-6
3AI-3-2.2	B	7-6
3AI-3-3.1	D	7-23
3AI-3-3.2	C	7-23
3AI-3-3.3	C	7-23
3AI-4-1.1	D	7-5
3AI-4-1.2	C	7-5
3AI-4-2.1	B	7-5
3AI-4-2.2	A	7-5
3AI-4-3.1	A	7-5

3AI-4-3.2	B	7-5
3AI-5-1.1	C	7-24
3AI-5-1.2	A	7-24
3AI-5-2.1	C	7-24
3AI-5-2.2	B	7-24
3AI-5-3.1	B	7-24
3AI-5-3.2	A	7-24
3AI-5-3.3	B	7-24
3AI-6-1.1	D	7-10
3AI-6-2.1	C	7-21

Attachment 5

REPORT OF INVESTIGATION
BY CHRIS McELWAIN

1. On Saturday 7/27/91 at 1P.M., I told Leo Fahmie, KJ6HI, an employee of Henry Radio, West Los Angeles, that I was interested in obtaining a ham license. He handed me a flyer (exb.A), with addition in pen of Charlie Pascal and His new phone number. Leo said to make sure to mention his name to Charlie because it may help me get a spot in the class.

2. On Sunday 7/28/91 at 5:13 P.M. I called 213-313-3863 and made contact with Mr. Pascal. I told him that I was interested in getting my ham radio license with code. He told me there was a class on August 4th, and if I had any knowledge of code he could pass me. I told him "I pretty much know the letters, but can't copy 5 wpm." Charlie said that "I can take you all the way to General, Advanced, and Amateur Extra, whatever you'd like." Next He gave me the address which was 4754 La Villa Marina, unit J, Marina Del Rey, California. He gave me the phone number of Sandy, 213-305-1714. He told me to call her and let her know about registering and tell her I had already talked to Charlie. He told me the class would cost $150.00. He said to try to get into the class on the 4th, he said it work better for me, especially with the code. I told him that I have no one to practice the code with, he told me "I will get someone for you to practice with, we will fix you up, get in to the class on the 4th".

3. I called Sandy 7/29/91 7:25 P.M., in which I reached her answering machine. I left a message, that I was interested in the class on Sunday. I left my name, address and phone number.

4. On 7/30/91 I received a message from Mr. Pascal at 10:28A.M. He Said "If you're still interested call 213-305-1714". He left the time, date and address of the class.

5. On 7/31/91 I called Sandy and reached her. She said that "I have you as a possibility for the class and would be happy to have you in the class".

6. OOC, Dave Morse came to my house to brief me. At that time Dave and another Advanced class Amateur administered a quick 5 W.P.M. Code test. Both had determined there was no way I could pass the test at this time.

7. I called Sandy with Dave on the other extension. I left a message to let her know that I will come to the class. I told her that although I know some Morse Code I cannot copy 5 WPM.

8. I arrived at the class on Sunday 8/4/91. I ran into a friend Leslie Haliburton from the S.F.V. Amateur Radio Club, and intercepted her outside. I told her that I was Investigating the class and that no one was to know that I was a Licensed Amateur.

9. I immediately went to the phone and called Dave Morse to inform him that Leslie was in the class. About 9:30 Charlie started teaching the theory portion of the exam. At 12:05 we broke for a 1 hour lunch, for those who wanted to do code practice, it was done during lunch.

10. Charlie showed us the difference between a dit and dah. In practice Charlie only covered eleven letters, all 10 numbers and the period. THe letters consisted of (EISHTMONADU). Charlie said that" you know 11 letters the number and the period, you know enough for the code test". Then he sent the sentence (THE TRAIN IS NOT AT THE STATION.). Then he sent the next sentence (THE NAME IS TOM AND I AM IN TENNESSEE.). Then Charlie said that " the test will be one of the two sentences, I would violate the integrity of the test by telling which sentence". I asked who would give the test and he said," I will". About 45 minutes were spent in code preparation. The remainder of the afternoon, 1:10P.M. to 2:30, was spent on the theory preparation.

11. The 1st two VE's to arrive were Terence Pierce, KI6TY VE#9205, Lance B. Ferrenti, AB6DB VE#9804. They administered the Novice written exam. The two VE's graded the written exam for novice and everyone passed. They announced out loud how many people got 100.

12. As the 1st 2 VE's were finishing the grading the third VE, J.J. Quinn, KJ6HW VE#593, arrived. The 3 VE's Administered the Technician theory test. Some test scores were given out.

13. Charlie came into the room and announced that he would give the code test. He said, "1st I,ll send you the sentence, then random letters and the numbers". The test consisted of one sentence which was (THE NAME IS TOM AND I AM IN TENNESSEE.) "OK here comes the random letters" (approx. 11 letters that were learned), then Charlie said "here are the numbers". The speed seemed slow and when I asked about it Charlie explained that other people use the Farnsworth method. It is my opinion that the code speed was much less than 5 W.P.M. The code test was sent by Charlie on an MFJ keyboard, not via code tape. All papers were collected. One classmate said he couldn't copy the code, and a couple of people didn't take the code exam. All 3 VE's graded the papers.

14. Approx. 13 people participated in the class and one person came in to take the code test only. I was never given the cost of the exam, but was told that if I wanted to come back and take another code exam it would cost $5.25. No one was asked for any form of ID.

W5YI-VEC

National Volunteer Examiner Coordinator

This certifies that: CHRIS McELWAIN

NAME STATION CALL SIGN

DATE OF ISSUE: 09/04/91

CITY/STATE (Session Site)

VENICE, CA

10331 LINDLEY # 141

NUMBER AND STREET

NORTHRIDGE CA 91326

CITY STATE ZIP

has SUCCESSFULLY PASSED the following elements:

☒ 1(A) 5 wpm ☐ ~~1(B) 13 wpm~~ ☐ ~~1(C) 20 wpm~~ ☒ 2 ☒ 3(A) ☐ ~~3(B)~~ ☐ ~~4(A)~~ ☐ ~~4(B)~~

and will be given credit for this examination element when the appropriate additional examination element is (re)taken at a subsequent examination session within one year of the date of issue of this certificate.

has SUCCESSFULLY PASSED all elements for the following operator license class:

☐ ~~Novice,~~ ☒ Technician, *Plus* ☐ ~~General,~~ ☐ ~~Advanced,~~ ☐ ~~Amateur Extra.~~

If you already have an FCC-issued amateur radio license, this certificate validates temporary (interim) operation with the rights and privileges of your new operator class (see Section 97.35 of the Commission's Rules) until you receive the license for your new operator class, or for a period of one year of the date of issue of this certificate, whichever comes first.

When operating on an interim basis in the telegraphy mode, you must append your call sign with /KT (Technician), /AG (General), /AA (Advanced) or /AE (Extra Class.) Use the word "Temporary" before the identifier (KT, AG, AA or AE) when operating in the voice mode.

THIS CERTIFICATE IS NOT A LICENSE PERMIT OR ANY OTHER KIND OF OPERATING AUTHORITY

W5YI · VEC ★ HAM IT UP! ★ VOLUNTEER EXAMINING

Christopher J McElwain

SIGNATURE OF APPLICANT

VOLUNTEER EXAMINERS

	SIGNATURE	VE-#	STATION CALL SIGN
(1.)	[illegible]	9205	KI6TY
(2.)	[illegible]	9804	AB6DB
(3.)	[illegible]	6543	KJ6HW

W5YI-VEC; NATIONAL VOLUNTEER EXAMINER COORDINATOR

FREDERICK O. MAIA, W5YI

P.O. Box 565101; Dallas, Texas; 75356 - Tel: (817) 461-6443

W5YI-VEC

National Volunteer Examiner Coordinator

This certifies that: CHRIS McELWAIN (NAME) — (STATION CALL SIGN)

DATE OF ISSUE: 09/04/91

CITY/STATE (Session Site): VENICE, CA

10331 LINDLEY # 141 (NUMBER AND STREET)

NORTHRIDGE (CITY) CA (STATE) 91326 (ZIP)

has SUCCESSFULLY PASSED the following elements:

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W5YI · VEC — HAM IT UP! — VOLUNTEER EXAMINING

Christine Lynn McElwain
SIGNATURE OF APPLICANT

VOLUNTEER EXAMINERS

	SIGNATURE	VE-#	STATION CALL SIGN
(1.)	[signature]	9205	KI6TY
(2.)	[signature]	9804	AB6DB
(3.)	[signature]	6593	KJ6HW

W5YI-VEC; NATIONAL VOLUNTEER EXAMINER COORDINATOR
FREDERICK O. MAIA, W5YI
P.O. Box 565101; Dallas, Texas; 75356 - Tel: (817) 461-6443

Received 1/27/91 from Leo Graves of Henry Radio

TECHNICIAN NO C

MAY 18 & 19 . BURTON C

HENRY RADIO

Sponsored by L.A. County Parks & Recreation Dept

Communications and Safety through Education

The CALIFORNIA AMATEUR RADIO SCHOOL will teach you to pass your entry level license exam with the F.C.C. in just one full weekend of entertaining instruction.

Your accelerated class instruction will also include the following areas of Amateur Radio

- You will learn F.C.C. regulations, novice & tech theory
- Hands on demonstrations of H.F. & V.H.F. radios
- Learn to make and receive personal phone calls from a handheld radio
- Suggestions for proper antenna & radio installations for fixed and mobile applications
- Cruisers - learn how to obtain reciprocal licenses in foreign countries
- No code or radio theory experience necessary
- Practice tests and theory booklet provided at registration time. (Optional code tape included if requested at no charge)

WE WILL GLADLY TAKE YOU THROUGH ALL THE UPPER LEVELS OF HAM LICENSES WITH CONTINUING FOLLOW-UP CLASSES

LIMITED SEATING PRE REGISTRATION SUGGESTED

$150 No code Fee

Send check or money order to CARS, at 13425 Maxella Avenue Suite #400 Marina del Rey, Ca. 90292

213-301-1597 for dates of other classes

NAME_____ PH* Day_____ Eve._____

ADDRESS_____ City_____ Zip_____

CALIFORNIA AMATEUR RADIO SCHOOL — CALIFORNIA/MARITIME AMATEUR RADIO SCHOOL

CHARLIE PASCAL

(213) 313-3863

EXHIBIT A

You are still required to make some type of public announcement of your test session even if testing is not open to the public -- such as a special examination for the handicapped or a graduating ham radio class. The public announcement should specify that your test session is not available to the public and the reason(s) why it is a closed session. In order that your "closed" test session not be perceived as a "secret" test session, it if often desirable to invite observers to your session.

■ **Request a test session package**

The CVE who requests the testing session must advise us of the following points in the initial letter or contact with the VEC Office.

- Name of Contact VE
- Contact VE's call Sign
- Contact VE's accreditation number
- Contact VE's address
- Contact VE's home telephone number
- Test site (city and state only)
- Test date

The test site and date may be adjusted slightly (a week either way) without VEC notification should the need arise. Notify us of major test session site and date changes -- or if your session is canceled. (**VERY IMPORTANT:** All testing materials must be returned to the VEC Office promptly if your test session is canceled.)

The Initial test session notification letter must be sent (or telephoned) to the VEC. (See Section 2.3, *Communicating with the W5YI-VEC office.*) Advise the VEC Office of the above mentioned seven points so that a test session package may be sent to you. The contents of this package must be held in confidence against disclosure. Only accredited VE's participating at your test session may have supervised access to the various examination designs that will be utilized at your session.

We don't need a lengthy advance notification of your examination session. We can authorize your test session as soon as you advise us that you have the required VE's and test site. We are not required to notify the FCC of your test session as in previous years. Although we prefer a letter at least two weeks in advance of the session, we can even accept test session requests by telephone, FAX or MCI Mail. (again, see Section 2.3).

If your group gives tests four or more times per year, please consider appointing a permanent CVE and join our Automatic Distribution Program (ADP) which saves us additional time and money. (See the ADP information.) You may, of course, apply to conduct only a single test session. Advise the VEC Office of the test session date if only one test session is planned.

3.3 Conducting an Exam

Now lets go through the steps necessary to actually give an examination. If a lengthy explanation is needed for any one step we'll cover it in a separate chapter for easier reference.

■ **Register the Applicants**

The first step of registration is the identification of each applicant. The rules require that two identification documents be inspected for all applicants. We prefer that at least one of them be a state driver's license with the applicant's photograph on it. Although rare, some people have tried posing as another person to pass an examination for them.

After the VE team is satisfied that each applicant has been positively identified, the applicant's name, call sign (if any) and telephone number should be recorded on the Manifest Sheet.

The Reimbursement (Test) Fee must be charged each applicant. Be certain that you advise applicants of the mandatory (1991) $5.25 fee. Since both VE teams and the VEC Office have expenses that must be paid, expense reimbursement test fees are shared between the VE team and the VEC Office. The test fee is charged even if the candidate fails the test or if the candidate pays in advance and fails to appear for the exam. (See *Processing the Paperwork* for further information).

■ **Fill Out FCC Form 610**

At this point each applicant should fill out an FCC Form 610. Perhaps the most important of all the administrative chores is the proper completion of Form 610. The greatest cause of VE exam session errors by far is a defective Form 610. The chapter entitled *Filling Out FCC Form 610* gives all the details.

■ **Give the Exams**

Pick a quiet, distraction-free room for giving your examinations. You may give your applicants either the code test(s) or the written test(s) first. You

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12:30 PM - Some of class already here ✓ Attachment 6

Bending of signals like on 2 meters = tropo (for tropospheric ducting)
travel over 500 mile (increases distance - play word on list)
Bending of waves - caused by (Sand)

? equipment
watt meter or SWR meter for most accurate
transmitter antenna tech or transmitter antenna jack
best or most!
2 of these are on test

multimeter - volts, current + resistance
? What is a multator

& SWR meter same as ↓
? is what does a directional watts meter
reads forward and reflected power

100 W forward + 10 back = 90
96 w f 4 watts reflect = 92

what is minimum voltage lethal to human?
30 ~~V~~ - (they actually use word dangerous ~~minimum~~ " Sand)

who sets standards - ANSI
(Amer Natl Stds ~~Inst~~ Inst) - they do

? What does ANSI set
sets RF exp limits

? In wiring up power supply, where does
black + red wire go - fuse

1

In tuning or adjusting transmittal filter (2)
devise — Dummy load

Electrical components

① capacitor - stores energy
rated in farads - stored in farads
capacitor has 2 plates

? What is material between 2 plates that ③ ④ ⑤
~~allows capacitor to store energy~~ ⑥ the electric material ~~ferrite~~ ⑫
Answer ②

? How is capacator usually rated -
microfarads & volts

Sandy looking at all three tests - wanted Charlie to clarify (Cde said this & had tests in front of her)

? what is micro farad 10^{-6}

What is the law - Ohms (missed part of what he said)

Sandy - Under that question need to understand it is understand 10^{-6} that is kg (minus is key in test?)

? What does inductor do
Coils - stores and opposes current change

? what does resistor do?
Resists

? What is 4th band on a resistor
tolerance

Sandy - "Ohm is basic unit of resistance & the 4th band indicates tolerance in %"

Modes of communication
(new student arrived - took quick break here)
Will be doing a new handout. Will try to get it to each of us in a week
Modes of com
CW - morse code = A1A
Telegraphy - Amplitude.
CW = switch " carrier off & on
Sandy - "Amplitude modulation is used"
switches strength off & on

morse code designated by ITU
? In ITU, what does the first letter designate
mean - A = type of emission used
International Telecomm. Union - not needed for test

F Modulation = similar to PM Modulation

J3E = single sideband

Charlie thinks this is all we need to know

Antennas -
vertical - they are electric lines of force
There is something (two words) that says magnetic - wrong - plz word
transmits electric lines of force perpendicular
(two words - Sandy)

Balun - matches coax (is fed) to antenna (4)

Yagi - type of beam line
Parallel Parasitic element - Sandy -
~~plywood~~
has a director & driven element feeds
1/2 wave length

Sandy - read ans. to one of question
"1/2 wave length driven elements
with parasitically parallel elements"
driven

Balanced antenna - same as symmetrical centered about
the feed point - not at ground point) -
Sandy

Coax connect 2 antenna - balanced &
symmetrical

Sandy - "just got tests last night just
received"

? How do you minimize radio freq. exposure
- mount or point close to ground - Sandy
acid mount

FM - reactance modulator -

? If reactance mod. fails -
you'll have unmodulated carrier (waves) Sandy

thru - let me give these to you again you some of
? Sandy: "What freq. are attenuated by a low pass filter" - "will not let anything above cut of freq pass"

? ~~Ed~~ Sandy: "What circuit attenuates electrical energy ~~passed~~ below a certain frequency: - Band Pass Will attenuate above & below" -

~~?~~ Sandy - there is a couple

Yagi is 2 or more tubes physically arranged parallel to each other

VHF is direct wave & diff or ground wave
HF is thru sky wave

F1 & F2 2 distinct subwaves.

Charles - "Sandy, keep all three tests there & make note on anything I miss" - statement by Charles

Control Operator funct - control point
3rd party - unlicensed person operat - con
how much power - minimum FCC

Signal report -
5 perfect
7 moderately noisy

Using repeater - FCC says - pause briefly between transmission

1st response comm from disaster - tactical ⓘ ⓒ
? Who may declare state of comm. ~~disaster~~ emergency?
FCC when disaster disrupts communica
? temporary KT - If someone has novice license, passed their Tech, CSCE, may operate tech pwr, if they sign temporary KT after call sign

Internatl 3rd party traffic - must identify after each exchange of communication

Tech can operate anything above 50 mz therefore - remember all ~~for~~ 4 of

(Sandy - said "remember - no novice just tech - general - advanced - extra")

146.52 - all but novice

Remote control ~~tx~~ TX - do not have to identify provided - no ~~tx~~ address + call sign affixed to TX

Amateurs may retransmit ~~tx~~ radio broadcasts from Space shuttle - as long as approved by NASA

Repeaters have offset - input - receive
output - TX

Input/output diff
6 meters = 1 mHz
2 meters = 0.6 mHz
1¼ mtrs = 1600 KHz
Is same as taught before - they just are playing games with decimal

- Stretch break - Wo to Sandy - "what happened?"
A: someone complained about the code. Thought or thought it might be a guy who wrote a bad check. He's the only one who didn't call about the letter. We were told it was a woman. Someone saw the letter & a woman wrote complaining about the code saying it wasn't 5 words a minute. How could anyone tell? Next time, when they start morse, will actually have a class and use certified tape. Be about 2 wks. Silent person is someone who is upset at being not being allowed to participate in school. Is someone on 435?

Propagation - all VHF & UHF
one phenomenon that causes air waves to bend = tropo
what is layer 2 layers by day & 1 at night = F
2 distinct sub layers of day = F
What is lowest layer used for prop = E
Densest layer to absorb - D (sandy - Dis most densest)

Best place to place SWR meter or watt meter = for best reading - at antenna term or jack
multi-reads = volt, current, resistance
another name = SWR - direct watt meter reads forward & reflected power
Volts consid dangerous - 30 V
ANSI sets min RF exposure limits

— When working with power supply + black or red wire connected to fuse
When tuning or adjust a TX filter device
dummy load
-Capacitor - store energy
~~rated~~ stored in farads = micro farads & volts
ferrite material between 2 plates of capacitor is what - die electric material
What is law showing math relationship
shows math rel btw volts, ohm, amps =
ohms law
Inductor is a coil - stores and opposes
current changes
Band pass filter = attenuate above & below
low pass) = attenuate above a freq
4th band of resistor - tolerance in %
modes
cw or morse code - telegr - turns
amplitude modulated CXR off & on - 1st letter
ITU covers type of emmiss or modulation
used = as A = amplitude
Key words vertical = electric lines of force
& perpendicular
Baldwin = devices match coax to (feed line) to
antenna

FM = PM mod of freq

Reactance modulator makes FM - causes freq to change - if reactance mod blows - FM TX fails - unmod CXR wave

Yagi - parasitic = parallel "Sandy (covers / guest pool guests)"

2 or more parallel tubes in air

Balanced antenna - symmetrical at feed point

2 min radio freq exposure - mount at ground

Microfarad = 10-6

---

novice review

Amateurs = self training

Part 97 - ~~cover~~ governs all but construct static stads

If another person comes over & is lic - they are control operator - if one does something wrong (visitor) - both

US callsign = KANTW =

AA2Z = US

CE = Foreign

FCC req. = current mailing address - for correspond

Sandy: dog for adult

5 months

female will have puppies

Rep of foreign Govern - co (10)

3rd party trf = can communicate foreign
country 3rd party agree
Limit access to TX = Key op. off + ow switch
ℓD = 10" + at end
novice - entg
Tech - above
No business
Business = Immediate safety
5 principles of radio - 5 fundamental principles
Emerg communic
Advance of radio
Impro. comm
Increase train
Intntl good will

Received complaint of TVI - first must ✓ your TV
- Put low pass filter TXR - put on TV = high pass
Current = 2 direct = DC
" " = OC
rated in amps
Voltage = equiv to water pressure water pipe
unit of resistance = ohms
math relat Volt, current, ohm = Ohm's
propagat in ionosph = sky wave
" on gnd = ground wave or direct
UHF + VHF is ground wave or direct

freq to band conv = 300

222.1 = 1¼
28 mhz = 10 meter

Novice priv = 80 meter 3700-3750 = CW
15 meter 21.1-21.2 = CW
28 mhz or 10 meter 28.1-28.5 CW & voice

222.1-223.91 - all modes

Antennas - proper length to freq TX on
for ½ wave antenna 468/F req
¼ " " 234/F req

10 meter ½ wave = 16 feet
10 " ¼ " = 8 feet

Keep antenna away from face -

SWR = measures standing wave or direct watt meter

TX apart (removing shielding from TX) we must make certain TX can't be accidentally energized

Harmonics = mult thereof 2nd 4th harm 7.160 X 4 =

Signals all random - called parasite or spurious signals